

Vladimir Novikov



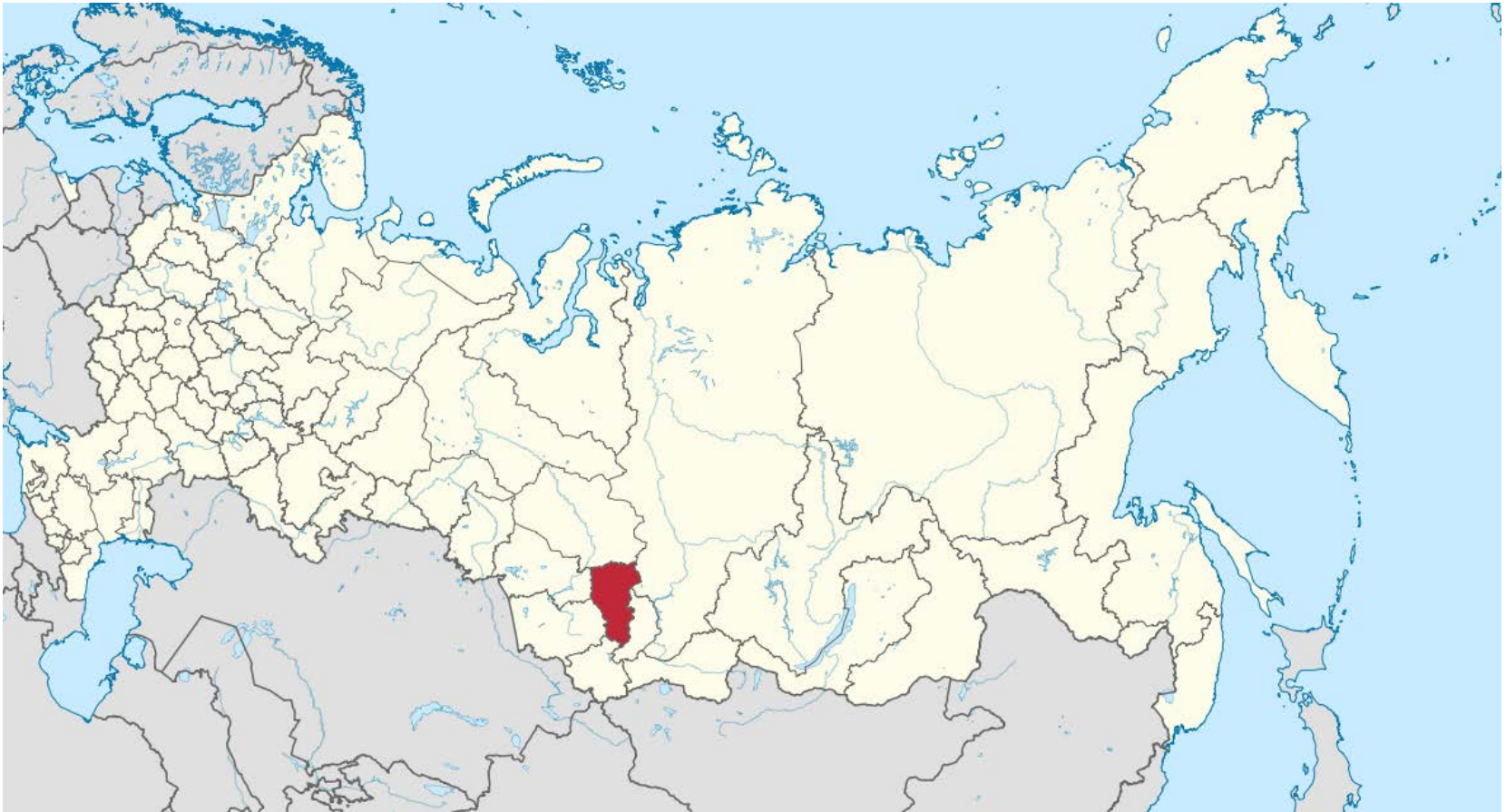
4th July 1950

—

2nd October 2015



Vladimir Novikov



Vladimir Novikov was born in Kemerovo, Siberia

Vladimir Novikov



Alma Mater – Moscow Institute of Physics and Technology



In 1973 Vladimir received M.Sc in Physics from MIPT

Vladimir Novikov



Keldysh Institute of Applied Mathematics, Russian Academy of Science



1981 – Ph.D in Physics and Mathematics
from KIAM

1993 – D.Sc (habilitation) in Physics and
Mathematics from KIAM

Vladimir headed Dept of Computational Physics and Kinetic Equations at KIAM

Vladimir Novikov

Scientific activity domains



- **Computational physics code development**

Non-equilibrium plasma model for calculation of atomic structure, energy levels, equation of state, opacity and emissivity

- **EUV Sources development**

Non-equilibrium plasma of DPP and LPP sources

- **Inertial Confinement Fusion Problem**

Non-equilibrium radiating plasma of liners and thermonuclear targets

- **Impact and radiative processes in multicharged ion plasmas**

Models for computation of electron-ion interaction in non-equilibrium plasma

Vladimir Novikov

Scientific activity domains



- **Quasistationary plasma accelerators**

Computational analysis of radiation transport

- **Nuclear fusion**

Equations of state of hot dense matter

Vladimir Novikov

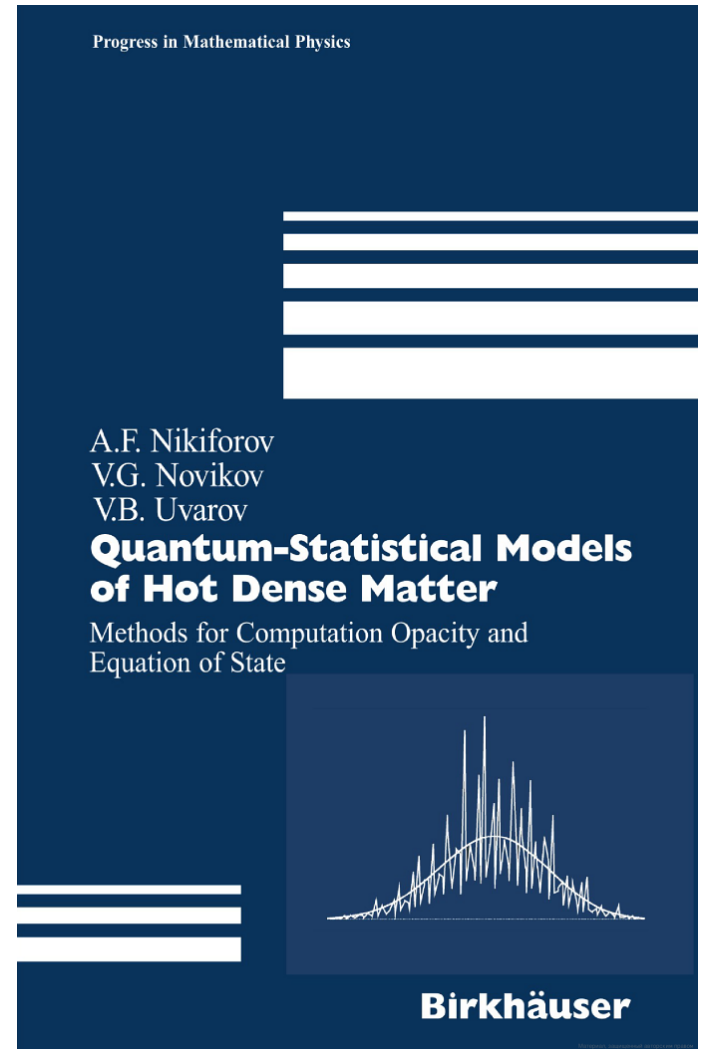
Lifework



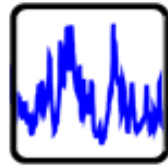
Quantum-Statistical Models of Hot Dense Matter Methods for Computation Opacity and Equation of State

Arnold F. Nikiforov, **Vladimir G. Novikov**, V.B. Uvarov

"...The relatively simple models ordinarily described in courses on theoretical physics are not applicable when we wish to describe the properties of matter in a sufficiently wide range of temperatures and densities. On the other hand, experiments aimed at generating data on properties of matter under extreme conditions usually face considerably technical difficulties and in a number of instances are exceedingly expensive. It is precisely for these reasons that it is important to develop and refine in a systematic manner quantum-statistical models and methods for calculating properties of matter, and to compare computational results with data acquired through observations and experiments..."



Vladimir Novikov



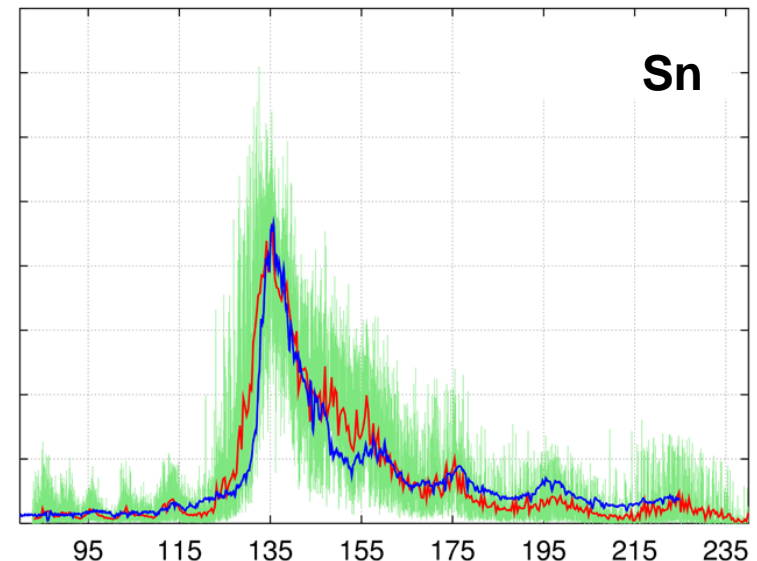
THERMOS
SOFTWARE PACKAGE & DATABASE



<http://www.keldysh.ru/thermos/>

The **Software Package and Database THERMOS** developed for computation of the radiative and thermodynamic properties of various substances and mixtures in a wide range of temperatures and densities. Essential for the calculations level energies and wave functions compute on the basis of Hartree-Fock-Slater model.

- T** - Thomas-Fermi model
- H** - Hartree, Hartree-Fock, Hartree-Fock-Slater self-consistent field models
- E** - Equation of state
- R** - Rosseland mean free path
- M** - Mixture of elements
- O** - Opacity calculations
- S** - Storage of data



Vladimir Novikov

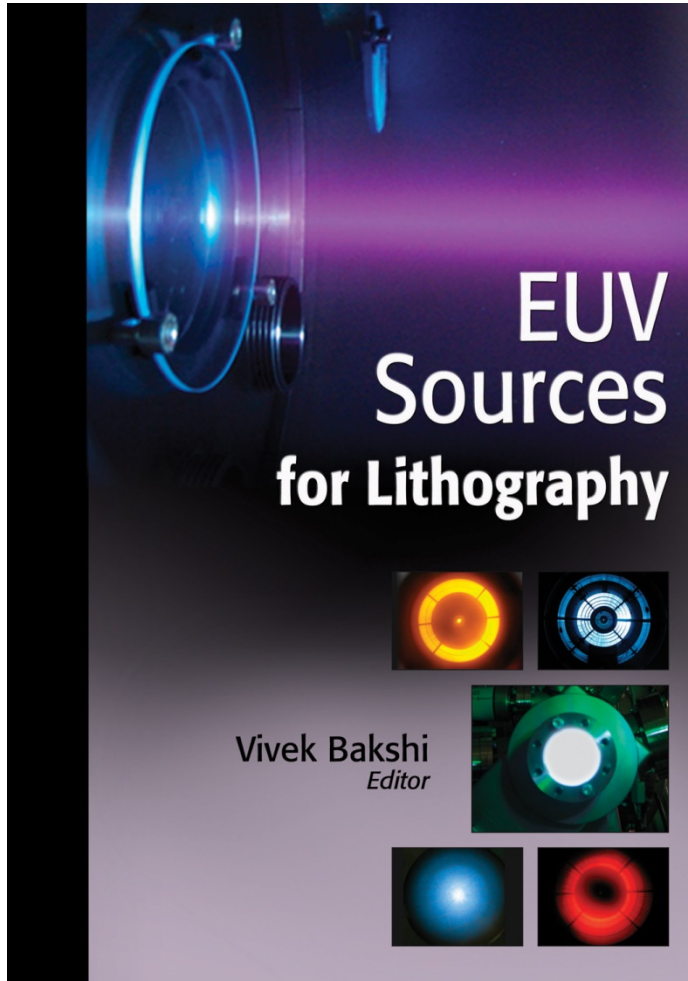


THERMOS code contributed a lot to EUV source simulation by providing the plasma properties for RHD codes

- **RZLINE code by Vladimir Ivanov (ISAN)**
- **RALEF code by Mikhail Basko (ITEP/KIAM)**
- **Z* code by Sergey Zakharov (TRINITI, EPPRA and Kurchatov Institute)**
- **3DLINE by Ilya Tsygvintsev (KIAM)**

Vladimir Novikov

Contribution to EUV



SPIE | EUV Sources for Lithography **2.6 - Z* Code for DPP and LPP Source Modeling**

Zakharov S.V., Novikov V.G., Choi P.

“...One of the main characteristics of a plasma emitting intensely in a relatively narrow EUV band is the presence of high-intensity non-equilibrium radiation in a wide spectral range. The plasma cannot be in LTE as EUV emission occupies only a small part of black body spectrum. The plasma dynamics must therefore be considered self-consistently with a non-equilibrium radiation field. Such self-consistent modeling of plasma dynamics together with plasma radiation is considered in the radiative magnetohydrodynamics (RMHD) approach. In the following, the elements will be discussed that must be considered in such a modeling approach...”

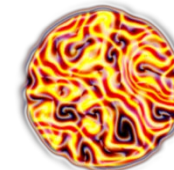
Vladimir Novikov



Academic
collaboration



ASML



fire

Fluid, Ions and Radiation Ensemble
in Integrated Plasma Modelling

FP7 Marie-Curie Action project

EPPRA, Keldysh institute, UCD

Vladimir Novikov



Teaching students



2002 – Professor of National Research Nuclear University MEPhI
(Moscow Engineering Physics Institute)

Vladimir Novikov

